

Attorney Docket No.: J3651(C)  
Serial No.: 10/506,374  
Filed: September 2, 2004  
Confirmation No.: 1186

### **REMARKS**

In view of the foregoing amendments and remarks, reconsideration and allowance of the subject claims is respectfully requested.

Claims 1, 2 and 3 have been further amended to identify the hair treatment composition as further comprising a propellant and to require that the composition is packaged in an aerosol container. Claims 5, 6, 10 and 12 have been amended to change their dependency from claim 1 to claim 2. Claim 9 has been amended to specify that hair treatment composition is in the form of a hair spray that contains propellant in an amount of from 15 and 50% by weight, based on the total weight of the composition. See, for example, page 25, line 29 to page 26, line 2. Claim 13 has been amended to specify that the composition is in the form of a mousse that contains propellant in an amount of from 3 to 30% by weight. See, for example, page 25, lines 29 to 31. New claims 20 and 21 (depending, respectively, from claims 1 and 20) specify that the A blocks, which may be the same or different, have a molecular weight in the range of from 1,000 to 500,000 Daltons and that the B blocks have from 5 to 500 repeating ethyleneoxy units. See, for example, page 12, lines 22 to 26 and page 18, lines 25 to 27. Entry of the subject amendments is respectfully requested.

Pursuant to the Office Action of April 7, 2009, claims 1-3, 5-6 and 19 stand rejected under 35 U.S.C. 103(a) as unpatentable over the citation previously identified as Nagarajan in view of the citations previously identified as Pei-Hong and Adams. Claims 1, 7-15 and 17-19 stand rejected over Nagarajan in view of Adams.

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in view of Frechet et al. (US2002/0160026). These rejections are respectfully traversed.

Pursuant to the subject invention it was found that hair styling compositions such as aerosol hair sprays and mousses having a desirable combination of performance properties, for example, style retention **at high humidity** as well as good washability from hair (properties that do not commonly go hand-in-hand) could be provided through the use of an ABA block copolymer having a hydrophilic polyethylene glycol B block joined through divalent linking units to polyacrylate or polymethacrylate A blocks having units as described by the subject claims; in particular, ABA block copolymers having a polyethylene glycol B block linked to poly(2-(dimethylamino)ethyl methacrylate) blocks. Moreover, it was found that aerosol compositions could be formulated with a desirably low volatile organics content (VOC) using such block copolymers. That these block copolymers could provide the benefits of good water solubility, while at the same time maintaining hold in a high humidity environment is surprising and unexpected. Applicants respectfully submit that there is nothing in the prior art that discloses or suggests the selection of the subject block copolymers for use in hair styling compositions as a means of achieving the benefits of the instant invention. Pei-Hong et al. is directed to the synthesis of what it characterizes as a poly[2-(dimethylamino)ethyl methacrylate]-**poly(propylene oxide)**-poly[2-(dimethylamino)ethyl methacrylate] ABA triblock copolymers. The poly(propylene oxide) segment of its polymers is characterized **as a hydrophobic moiety**. See, for example, the left column of page 625, about half way down:

In this article, we report the synthesis of ABA triblock copolymers composed of cationic PDMAEMA (as the outer A blocks) and PPO (as the central B block) via oxyanion-initiated polymerization. DMAEMA monomer can be protonated in an acidic medium. Its homopolymer is a weak polybase that is soluble in neutral or

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acidic aqueous media. Therefore, DMAEMA polymer can be used as the pH-sensitive component and hydrophilic end blocks, whereas PPO can be used **as the hydrophobic moiety in the copolymers**. (Emphasis added.)

PPO (also referred to as polypropylene glycol) and PEO (also referred to as polyethylene glycol or PEG) have many significant differences, in their structure (for example, allowing for differences resulting from the method of synthesis, PPO generally has methyl groups that project from its backbone chain, while PEO does not) as well as in their physical properties. See, for example, pages 722-737 and 701-717 of Volume 19, of Kirk Othmer Encyclopedia of Chemical Technology, Fourth Edition, John Wiley and Sons (1996), a copy of which is provided with the Supplementary Information Disclosure Statement that accompanies this submission. The polymers can also differ greatly **in their water solubility**, a property that depends, in part, on molecular weight.

Pei-Hong seeks to form a polymer with a **hydrophobic B block of PPO**, while the subject invention makes use of a polymer having a **hydrophilic water soluble B block**. There is nothing in Pei-Hong that discloses or suggests substituting its **hydrophobic PPO B block** with a **hydrophilic PEO B block** or that provides any teaching or suggestion to a formulator that a styling polymer that provides both high humidity hold and good solubility in carrier systems for hair styling products (which commonly comprise a hydroalcoholic solvent), could be derived from the subject combination of A and B blocks.

Nagrajan discloses what it characterizes as block polymers of polyethylene glycol (PEG) and various vinyl monomers, namely acrylonitrile (AN), acrylamide (AAm), methyl methacrylate (MMA) and methacrylic acid (MAA). The particular polymers exemplified include PEG 20000 and PEG 9000 B blocks. There is nothing

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in the citation that makes the connection to the use of a polymer as described by the subject claims to a styling product that provides a desirable combination of both high humidity hold and good water solubility.

In the context of the subject invention, linking groups allow for A and B blocks to be bonded in separate reaction steps; the chemistry of such a synthesis may allow for more rigorous control of the end product. One skilled in the art reading Nagarajan et al. and looking at its suggested macroinitiator (see page 1246) might reasonably question whether the difference in energetics between the hydrogen atom alpha to the initiator terminus and the other hydrogen atoms might not be very close. If that is the case, the suggested procedure might just as likely form graft copolymers as block copolymers, and it is respectfully submitted that there is no objective data provided in Nagarajan et al. that differentiates graft from block copolymers.

Adams et al. is directed to polysiloxane block copolymers in which the B block is a polysiloxane. As noted in the Kirk Othmer Encyclopedia, the unshared electron pairs of the ether oxygens in polyethylene oxide gives the polymer strong hydrogen bonding affinity. This hydrogen bonding affinity contributes to the solubility of polyethylene glycol in water and hydroalcoholic solvents. In contrast, polysiloxanes are generally more hydrophobic in nature and tend to have greater affinity for hydrocarbons and oily materials. Accordingly, it is submitted that there is nothing that would lead one skilled in the art reading Adams, alone or in combination with Pei-Hong or Nagarajan et al. to the subject polymers as a means for providing the above described property benefits in hair styling compositions. Frechet et al. is directed to cosmetic or personal care compositions for styling hair that comprise a thermoplastic elastomer which is a block copolymer comprising a core polymer

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having a backbone comprising at least a proportion of C-C bonds and two or more flanking polymers. The composition of the B-blocks is described at paragraph 0060 and 0061 as follows:

It is preferred that the core polymer is a polymer or copolymer of an acrylate ester. Copolymers may, for example, be random copolymers of two or more (preferably two) different acrylate esters... Representative examples of monomers of the core polymer include, but are not restricted to benzyl acrylate, 4-butoxycarbonylphenyl acrylate, butyl acrylate, 4-cyanobutyl acrylate, cyclohexyl acrylate, dodecyl acrylate, 2-ethylhexyl acrylate, heptyl acrylate, iso-butyl acrylate, 3-methoxybutyl acrylate, 3-methoxypropyl acrylate, methyl acrylate, neopentyl acrylate, nonyl acrylate, octyl acrylate, phenethyl acrylate, propyl acrylate, N-butyl acrylamide, N,N-dibutyl acrylamide, ethyl acrylate, methoxyethyl acrylate, hydroxyethyl acrylate, diethyleneglycolethyl acrylate. More preferred are polymers or copolymers of a (C1-C3 alkoxy)C1-C6 alkyl acrylate.

In one embodiment of the invention, preferred polymers are ABA block copolymers in which the A blocks are poly(N,N-dimethylacrylamide) or poly(N,N-dimethylacrylamide-co-methyl methacrylate) and the B block is poly-((2-methoxyethyl)acrylate) or poly((2-methoxyethyl)-acrylate-co-ter butyl acrylate). Even more preferred are ABA block copolymers in which the A blocks are poly(N,N-dimethylacrylamide-co-methyl methacrylate) and the B block is poly-(2-methoxyethyl)acrylate) and ABA block copolymers in which the A blocks are poly(N,N-dimethylacrylamide) and the B block is poly((2-methoxyethyl)acrylate-co-tert butyl acrylate).

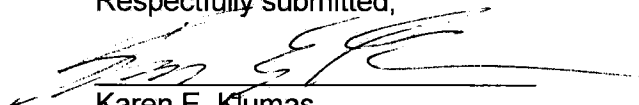
Thus, the chemistry of the B block of Frechet et al. is similar to that of the A block of the subject polymers. In Frechet et al. both the A and B blocks can be polymerized by a living free radical polymerization method via vinyl linkages. There is nothing in the citation that reasonably discloses or suggests ABA block copolymers having a polyethylene oxide B block, or that discloses or suggests either a rationale for substituting its polyacrylate B block with a polyethylene oxide B block or a mechanism for achieving same.

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There are many and diverse polymers, e.g., polyamides, polyesters, polyethers, polystyrenes, polysiloxanes, etc..., all of which have their own set of physical and chemical properties. It is respectfully submitted that the references that have been applied against the subject claims can not be reasonably said to provide a basis for one skilled in the art to select the subject ABA block copolymers as a means of imparting both desirable high humidity hold and good solubility in an aerosol hair care composition. Solubility is often the antithesis of high humidity hold. A more soluble polymer would generally be expected to dissolve or degrade in a humid environment resulting in a loss of hold. That both a desirable degree of solubility could be provided while still obtaining the benefits of hold could be achieved using the subject polymers is indeed surprising and unexpected.

If a telephone conversation would be of assistance in advancing the prosecution of the present application, applicants' undersigned attorney invites the Examiner to telephone at the number provided.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Karen E. Klumas', is written over a horizontal line.

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